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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/722,838      | 11/26/2003  | Suan Jeung Boon      | 303.601US3          | 8165             |

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EXAMINER

MITCHELL, JAMES M

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2813

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |   |  |
|------------------------------|--------------------------------------|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/722,838 | <b>Applicant(s)</b><br>BOON, SUAN JEUNG |  |
|                              | <b>Examiner</b><br>James M. Mitchell | <b>Art Unit</b><br>2813                 |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9,27-33 and 59-64 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9,27-33 and 59-64 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/15/06, 11/26/03</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This office action is in response to applicant's request for continued examination filed June 15, 2006.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1, 27, 28 and 30-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Nguyen et al. (U.S. 6,245,595).

4. Nguyen (Fig. 3, 5, 6) discloses:

(cl. 1) a method of packaging comprising: applying an adhesive (214) to a first side of a finished wafer (100), the first side of the finished having at least one die (102), the adhesive being one or more of an elastomer<sup>1</sup> (e.g. "silicone" material is compliant-rubber like material) applied in fluid form ("inject"; step 610; Fig. 6), a thermoplastic material, or a pressure-sensitive film (Col. 6, Lines 14-21); and forming an array of conductive elements (108) within the adhesive to a level to allow the adhesive to contact a support (502) to attach the at least one die to the support (Col. 6, Lines 45-

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<sup>1</sup> Also underfill/encapsulant discloses having an elastic modulus. (

49), the array of conductive elements electrically coupled to an array of connection pads (104) on the at least one die;

(cl. 27) forming an array of conductive elements (108) within an adhesive layer; and applying the adhesive layer to a first side of a finished wafer, the first side of the finished wafer having one or more dice<sup>2</sup> (102), after forming the array of conductive elements to couple the array of conductive elements electrically to an array of connection pads (104) on a first die of the one or more dice (Fig. 3);

(cl. 28) wherein forming an array of conductive elements within an adhesive layer includes forming openings in the adhesive layer (e.g. space taken by conductive elements forms openings);

(cl. 30) an array of conductive elements includes forming an array of solder columns (108; Col. 5, Lines 5-6; Fig.5);

(cl. 31) an array of conductive elements includes forming an array of solder balls (Fig. 3);

(cl. 32) applying the adhesive as a thin coating (Fig. 4) and therefore a film;

(cl. 33) singulating the first die (step 614; Fig. 6) from the coated wafer and forming an individual flip chip (e.g. contacts 108 near active area; Fig. 5).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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<sup>2</sup> Understood from the elected species to mean an IC formed on the wafer.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 2-4, 6-9, 29, 59-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen et al. (U.S. 6,245,595) in combination with Nguyen'881 (U.S. 6,352,881).
7. Nguyen discloses the elements stated in paragraph 4 of this office action and connecting the die to a motherboard/substrate (step 616; Fig. 6 & Col. 8, Lines 27-24), but does not appear to disclose a method of forming holes in the adhesive through etching and then filling the holes with a paste to form conductive elements in an adhesive.
8. However Nguyen'881 discloses either forming an adhesive over conductors (Fig. 1a-f) , forming conductors in holes of an adhesive (3a-c) by chemical etching (Col.6, Lines 10-11) and filling the holes with a paste (Col. 6, Line 12) to form the same structure (compare 1f, 3c).
9. Since both methods and its product produce equivalent structures known in the art, it would have been obvious to one of ordinary skill in the art to substitute the method of forming holes in an adhesive instead of covering conductive elements with an adhesive to produce an encapsulated wafer with exposed contacts.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable Nguyen et al. (U.S. 6,245,595) and Nguyen'881 (U.S. 6,352,881) as applied to claim 4 and further in combination with Kim et al. (U.S. 6,903,451).

11. Nguyen does not appear to show applying a protective coating to a second side of the wafer.

12. However, Kim (Fig. 24) utilizes applying a protective coating (82) to a second side (e.g., bottom) of the wafer.

13. It would have been obvious to one of ordinary skill in the art to incorporate applying a protective coating to a second side of the modified wafer including Nguyen in order to protect wafer and eliminate defects as taught by Kim (Col. 6, Lines 25-35).

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2813

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jmm, J.D.  
September 17, 2006



  
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